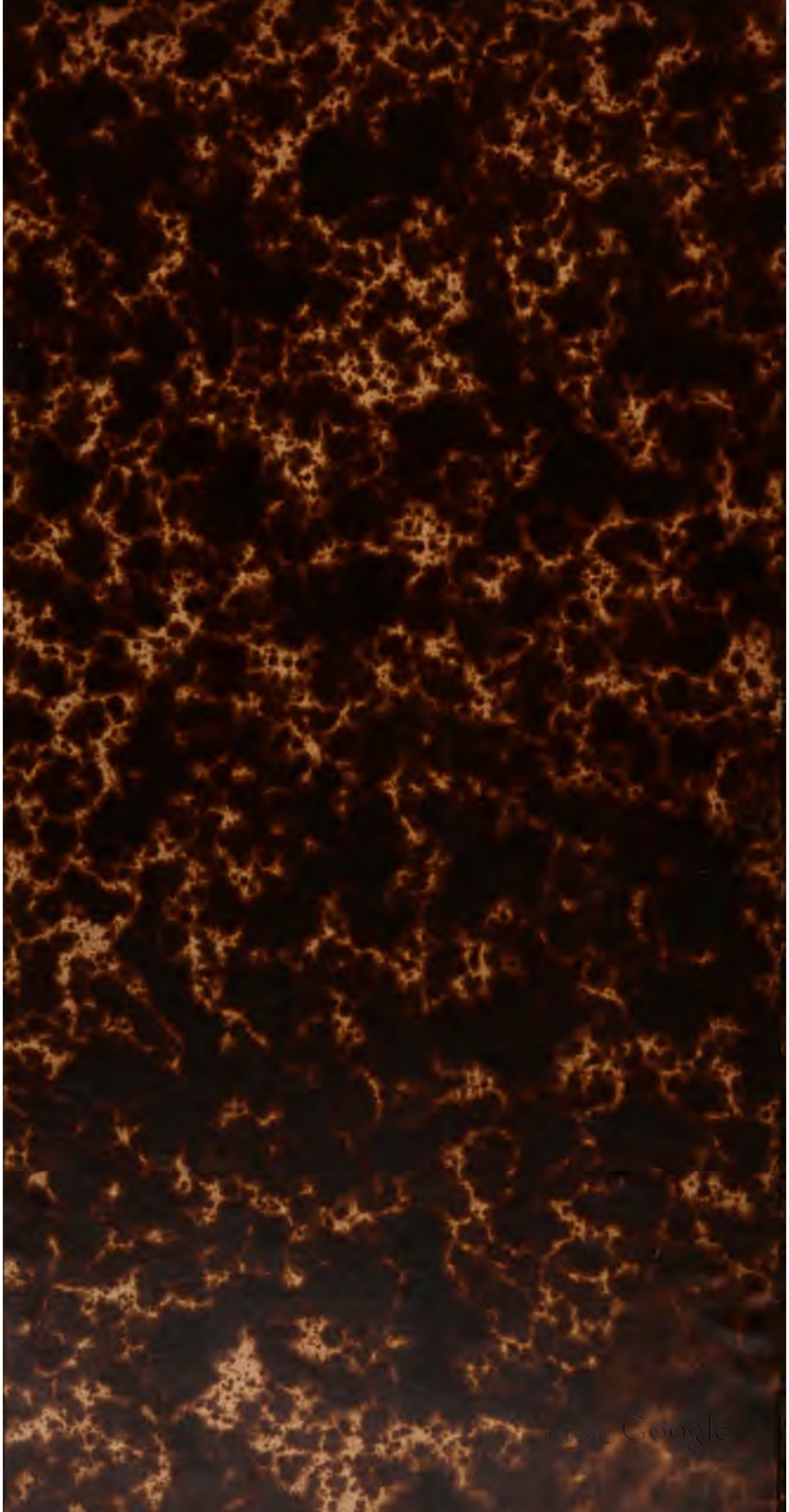

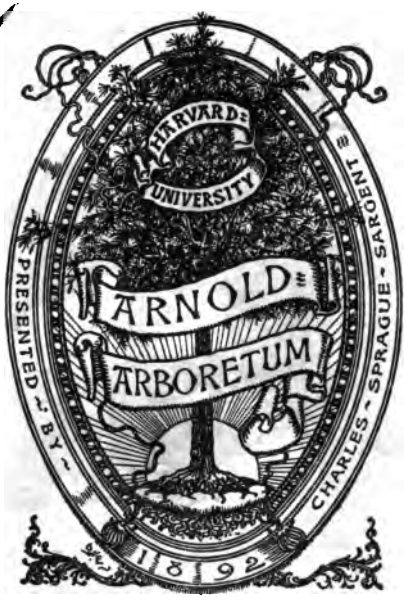

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with the writer's compliments.

On the Adventitious Vegetation of the Sandhills of St. Anne's-on-the-Sea, North Lancashire (Vice-County 60).

BY

CHARLES BAILEY, M.Sc., F.L.S.

MANCHESTER:
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—
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II. On the Adventitious Vegetation of the Sandhills of St. Anne's-on-the-Sea, North Lancashire (Vice-County 60).

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Received and read October 21st, 1902.

The shore-line north and south of St. Anne's-on-the-Sea is bounded by a series of drifted sandhills, behind which lies flat land of but slight elevation above the sea-level, and unbroken by any pronounced irregularity of surface due to hills, valleys, brooks, or dikes. There is an absence of agricultural soil upon its surface, and the sandy nature of the soil gives little expectation of yielding the rich flora which subsists upon it.

Until quite recent years the district was almost uninhabited; in a Poulton-printed book of two generations back the site of St. Anne's [the Star-hills] is thus described by the Rev. William Thornber, A.B.:—"The currents of the winds whistling among the Star-hills cannot fail to remind us, as we wander amidst their winding solitudes, of the awful moans of the 'Phantom Voice,' especially as we approach the Cross-slack" ("*An historical and descriptive account of Blackpool and its Neighbourhood*," page 342, Poulton, 1837).* Even yet St. Anne's contains no windmills or cornmills, from the refuse of which so many vegetable waifs get distributed. No local industries are in operation which are likely to lead to the introduction of foreign seeds. No ships stay on its portless shore to

* Its author was the incumbent of Blackpool, which he describes on page 112 as a hamlet, and on pages 229 and 266 as a village. He records the census of the visitors and inhabitants of Blackpool on the 17th August, 1837, as 2,566, of which 1,856 were visitors, thus leaving 710 adults and children as the number of permanent inhabitants.

December 15th, 1902.

discharge the ballast which they had taken in in foreign lands. And yet its adventitious vegetation is somewhat remarkable. Excluding the escapes of cultivation—which are numerous—I confine the following remarks to the four aliens which are the special subject of this paper.

Its sandhills and waste places yield an abundant supply of one of the North American evening primroses, *Œnothera biennis*, Linn. How long this plant has been growing in the district is not known, but it has been established in other parts of the Lancashire coast for the last seventy or eighty years. Whenever the land is disturbed, or the sand removed to form new roads, this plant is one of the earliest to grow upon it, and, although its conspicuous flowers make it an easy prey for constant plucking, it survives these depredations and continues to spread more and more.

The roadsides and sandhills furnish a home for large numbers of another colonist, the *Sisymbrium pannonicum* of Jacquin, belonging to central and eastern Europe, and from western Asia to India. It is an annual plant, growing from two to three feet in height, and fruiting freely, so that it is likely to become more disseminated than at present. Compared with my last year's observation of the plant, it occupies a larger area this year, and it is extending inland. Mr. J. A. Wheldon, of Walton, tells me that it occurs about Preston, and that he has seen it this summer in the neighbourhood of the corn-elevators at Fleetwood. Its general habit may be seen from the living and dead plants now shown to the members, which were collected a day or two ago.

I have now to report the occurrence of a third alien which, though not occupying anything like the extent of ground possessed by the *Œnothera* and *Sisymbrium*, has every appearance of having been established for some

years although, so far as I know, no record of its occurrence at St. Anne's has been published. I have had it under continuous observation since March last, but was unable to give it a name, awaiting further developments. The first indication of its inflorescence appeared when I conducted the Manchester Field Club to its station at St. Anne's, on the 26th July last, when one of the members of the Club picked up a plant with an undeveloped flowering-spike. It was then seen to be a species of *Ambrosia*, very like *Ambrosia maritima*, Linn., but the foliage was scarcely hoary enough for that species ; with the advance of the season and the maturity of its characters I have satisfied myself that it is a dwarf form of the American ragweed, *Ambrosia artemisiæfolia*, Linn. This plant is a great nuisance to agriculturists on the other side of the Atlantic, where it is regarded as a pernicious weed difficult to eradicate ; the reason for this will be seen from what is said further on respecting its mode of growth. Besides ragweed it has received the names of Roman wormwood, hogweed, stickweed, bitterweed, stammerwort, wild tansy, and carrot-weed. It is found all over the North American continent from Nova Scotia in the north to Florida in the south, and westward to British Columbia and Mexico. It also passes over into South America, and into the West Indian Islands.

Ambrosia artemisiæfolia has already established itself on the European continent ; I have examples of it in my herbarium from :—

France ; Loire, Saint Galmier, September, 1883.
Leg. Frère Anthelme.
„ Allier, Moulins, 31 August, 1883.
Leg. A. Pérard.
Switzerland ; Zürich, Oberlikon, 23 September, 1878.
Leg. C. Hofstetter.

Brunswick ; Steberburg,	September, 1881. Leg. E. Krummel.
Spain ; Andalusia, Malaga,	29 August, 1889. Leg. E. Reverchon.
Tyrol ; Innsbrück, Hölting,	29 September, 1883. Leg. J. Murr.

It has been found in Denmark, and also as a casual in England either as a garden weed or with ballast. The late date of its flowering is remarkable in all these continental examples, and corresponds with what takes place at St. Anne's.

The genus *Ambrosia* forms a portion of a somewhat aberrant group of the Compositæ, by reason of its species possessing a superior ovary, by the absence of some portions of their floral envelopes, and by the anthers not being truly syngenesious as they are in the other groups of that natural order ; hence some systematists form the group into a separate natural order. It has a wide distribution in both hemispheres ; the larger number of species belong to North America, while the rest are found in tropical Africa and India, as well as in the countries whose shores are washed by the Mediterranean.

Ambrosia artemisiæfolia is monœcious, both male and female flowers being found upon the same plant ; but in the St. Anne's plants a curious arrangement of the flowers at one time led me to think that the plant was dicœcious, because spikes bearing conspicuous male flowers would be found growing by themselves, and other plants bearing conspicuous female flowers grew by themselves ; but a little examination disclosed the fact that the other sex was present, though in much less proportion. The great mass of the plants bore the male flowers in profusion on the upper portion of the flowering spike, while the female flowers were below in greatly reduced numbers.

Both kinds of flowers are found in little heads or buttons, which are borne on erect spikes at the terminations of the branches, and the whole plant has an aromatic odour like that of wormwood, and from its external resemblance thereto it derives its specific name. The separate flowers are tubular, there being from a dozen to sixteen male flowers in each little head; and, generally below them, little verticils separated by bracts, each verticil containing about three or four female flowers; sometimes the spikes contain pistilliferous flowers only. The male flowers have a corolla, but no calyx; their anthers are conspicuous in the throat of the corolla, and they contain an abundance of nearly spherical pollen grains bearing very short spines over their surface; an abortive pistil, consisting only of its style, rises from the centre of the five anthers of each flower. The female flowers have a calyx, but no corolla, and their most conspicuous feature is the protruding halves of their bifid style, which curve over as far down as the base of the pistil while the stigma is fresh, but after fertilisation they curl up into the shape of a bishop's crozier.

As a rule the St. Anne's plants show a tendency to produce antheriferous flowers only, but occasional patches occur in which all the flowers of the spike are pistilliferous, no staminiferous flowers occurring upon them; the accompanying *Plate 1* is photographed from a sheet of herbarium specimens in which the free portions of the spikes contain staminiferous flowers with very few pistilliferous flowers below; while *Plate 2* represents two similar examples of plants upon which there are no staminiferous flowers—these pistilliferous spikes forming less than one per cent. of the whole.

Ambrosia artemisiæfolia grows at St. Anne's in patches several yards in diameter, and it monopolises the rough

portions of the hollows of the sandhills, almost to the exclusion of the native vegetation in the midst of which it occurs. Although the American "Floras" describe this plant as an annual, it is only the aerial shoots which die down before winter; but there is an underground portion which ensures that new plants shall spring up the following summer, even if mature seeds be not produced. While the species may have originally started at St. Anne's from the germination and growth of a few mature fruits brought to the locality by some unknown agency, the subsequent growths would seem to be the product of the slender stolons which proceed from the roots. These thread-like processes start at right angles from the thick portion of the root, and proceed in straight lines; they are of extreme length, many being over four feet, and I exhibit one which is rather more than three feet long taken from the ground three days ago. These hair-like stolons give off, at intervals of every few inches, upright shoots which make their way to the surface as young stems, and ultimately grow into separate plants. They are analogous to the runners of the strawberry, but instead of being found on the surface of the soil, as in that plant, they run underground. These processes are clearly seen in the herbarium specimens before the Society, and in the two plates photographed therefrom.

The fine hair-like stolons are well shown in the four or five lines from the lowermost of the three plants shown on *Plate 1*; while the left-hand example of *Plate 2* shows them at a later stage when they have become stouter, and where four or five shoots are seen rising at right angles from the stolon; the right-hand example on *Plate 2* has no connection with this stolon, the plant being laid over it to fix it to the sheet.

This account of its mode of growth explains the

circumstance of its gregariousness, and it is also an index of the persistence of the plant in its present locality. It must have been established for several years to account for the size of the patches, and it is surprising that it has not been detected and described earlier. As far as my observation has gone the species is confined to that portion of the sandhills which lies off the South Drive both to the north and to the south of St. Thomas's Church. But it is only a question of time how soon the locality will be built over, as the plot is on sale, and three of its sides already front roads or dwelling-houses. It may occur on other parts of the sandhills which I have not yet explored, such as the parts near to Fairhaven and Common Side, and the long stretch of level land which lies to the south of the Golf House; but from the railway certain parts of the land look quite suitable for the occurrence of the plant.

It is not easy to determine in what way it has established its foot-hold at St. Anne's. The older residents inform me that at one time the site was used for hen-pens and hen-runs, similar to those which are found at the southern end of the same group of sandhills, and I hazard the conjecture that the fowls have been fed, at times, with the grain-sweepings of the docks, from Fleetwood or Liverpool, in which fruits of the *Ambrosia* have been included.

There are a number of interesting native plants associated with it on the St. Anne's sandhills, besides the ubiquitous *Salix repens*, L., and *Rubus cæsius*, L., viz.: *Reseda lutea*, L.; *Viola Curtisii*, Forster; *Cichorium Intybus*, L.; *Hieracium umbellatum*, L.; *Convolvulus arvensis*, L.; *Echium vulgare*, L.; *Bartsia viscosa*, L.; *Thymus Serpyllum*, Fr.; *Polygonum Convolvulus*, L., &c. But there are several others growing with the *Ambrosia*

which, though native plants, may have been introduced in the same way, viz.: *Lepidium ruderale*, L.; *Lactuca virosa*, L; and *Marrubium vulgare*, L., the first and last of which I have also found in other localities in the neighbourhood.

Besides these species there is a fourth alien which may have been established as long as the *Ambrosia*, but of which I have met with but three or four flowering examples of what I take to be *Vicia villosa*, Roth, and probably Koch's variety *glabrescens* of that species = *V. dasycarpa*, Ten. It is allied to the purple-tufted vetch (*V. Cracca*, L.) but with fewer flowers in the spike, more separated one from the other and much less pendent. In the dried state in which it appears in the herbarium example now before the members, and of which *Plate 3* is a photographic reproduction, the handsome spikes of flowers are of a dark royal blue colour, but in their living state on the sandhills they are of a rich claret colour unlike that of any of our native vetches. The flower spikes do not show up very well on the plate compared with their appearance on the herbarium sheet to which they are affixed, but they may be identified from the leaves by their much longer stalks and by the absence of the prehensile tendrils which are so characteristic of the upper part of the leaves. The handsome flowers are sure to be gathered almost as soon as they are produced, as the locality is a favourite resort for children; certainly none of the flowers reached the fruiting stage this season.

Vicia villosa, Roth, is native in all European countries except Great Britain, and the present is probably the first record of its occurrence in this country. There is no antecedent reason why it should not be native here, but its occurrence with the other aliens named is against its being considered aboriginal.

EXPLANATIONS OF PLATES.

Plate I. Adult examples of *Ambrosia artemisiæfolia*, Linn., in which the flowering spikes contain antheriferous flowers, almost to the exclusion of pistilliferous flowers. (See p. 5.)

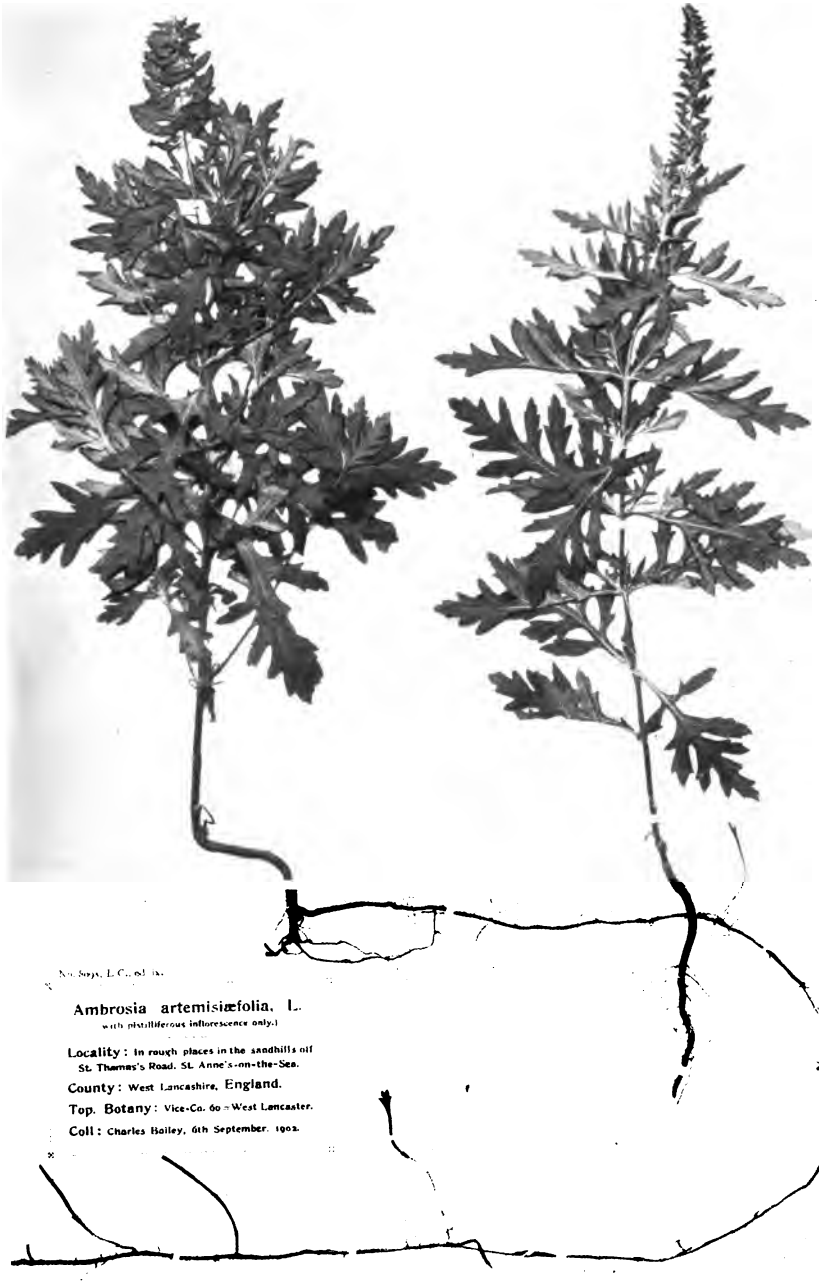
The long slender processes, from which new plants originate, are shown in the four horizontal stolons of the lowermost plant; several other stolons are also seen hanging from the base of the stems of the three plants on the sheet. (See p. 6.)

Plate II. Adult examples of *Ambrosia artemisiæfolia*, Linn., in which the flowering spikes contain pistilliferous flowers, to the exclusion of all antheriferous flowers—even at the tip of the inflorescence. The flowers extend for an inch and a half down the inflorescence of the left-hand plant, and for three inches on the right-hand plant, the flowers lying in the axils of the spreading bracts which separate each verticil. (See p. 5.)

The left-hand example has a stolon of older growth than any of those shown in *Plate I.*; this stolon is twenty inches long and extended much further in the ground but broke off when being removed therefrom; the portion attached to the plant shows five upward growths which would have formed new plants in the following year. (See p. 6.) The right-hand example has no organic connection with this stolon; it merely lies over it on the sheet.

Plate III. Flowering example of *Vicia villosa*, Roth, bearing ten flowering spikes not all equally developed. In the growing state the flowers are of a full claret colour, the standard and wings showing no contrasts in colour. The plant has not been observed in fruit this season. (See p. 8.)

All three plates photographed from herbarium specimens derived from the sandhills near St. Thomas's Church, St. Anne's-on-the-Sea, Lancashire. In the living state the plants were 2½ times the size of their representations on the plates.



Ambrosia artemisiæfolia, L.
with pistilliferous inflorescence only.)

Locality: In rough places in the sandhills off St. Thomas's Road. St. Anne's-on-the-Sea.

County: West Lancashire, England.

Top. Botany: Vice-Co. 60 = West Lancaster.

Coll: Charles Bailey, 6th September, 1902.